18STU06

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2022
(Second Semester)

Branch – **STATISTICS**

MATHEMATICS-II

Time: Three Hours Maximum: 50 Marks

SECTION-A (5 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (5 x 1 = 5)

1. The product of eigen values of $\begin{pmatrix} 1 & 0 \\ 0 & 2 \end{pmatrix}$ is _____.
   (i) 0 (ii) 2
   (iii) 3 (iv) 4
2. The complete integral of pq=k is _____
   (i) z=ax+(k/a)y+c (ii) $z=ax^2+(k/a)y+c$
   (iii) $z=ax^3+(k/a)y+c$ (iv) $z=ax^4+(k/a)y+c$
3. If f(x)=x then xsinx is an _____ function.
   (i) odd (ii) even
   (iii) onto (iv) into
4. $L(t^3)$=_____
   (i) $2!/s^4$ (ii) $4!/s^4$
   (iii) $2!/s^3$ (iv) $3!/s^4$
5. In Gauss Jordan method the augmented matrix is reduced to _____ matrix.
   (i) Upper diagonal (ii) Lower diagonal
   (iii) diagonal (iv) unit

SECTION - B (15 Marks)
Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks (5 x 3 = 15)

6. a) Find the eigen values of the matrix $\begin{bmatrix} 0 & 1 & 2 \\ 1 & 0 & -1 \\ 2 & -1 & 0 \end{bmatrix}$.

   (OR)

   b) Find the characteristic equation of $\begin{bmatrix} 1 & 1 & 3 \\ 5 & 2 & 6 \\ -2 & -1 & -3 \end{bmatrix}$ and show that it satisfies the equation.
7. a) Solve: $p^2+q^2=npq$.

   (OR)

   b) Solve: $p-x^2=q+y^2$
8. a) Find the Fourier expansion of f(x) = x in $-\pi < x < \pi$.

   (OR)

   b) Find the Fourier cosine series for $f(x) = x^2$ in $0 < x < \pi$.

Cont...

9. a) Find $L\left[\frac{\cos 3t - \cos 2t}{t}\right]$ *and* $L(t^2 \cos 4t)$.

(OR)

b) Find $L\left[te^{2t}\cos 5t\right]$ *and* $L\left[\frac{\sin^2 t}{t}\right]$.

10. a) Solve by Gauss elimination method
$x+y+z=9;\ 2x-3y+4z=13;\ 3x+4y+5z=40.$

(OR)

b) Solve by Gauss Jordan method
$5x-2y+3z=18;\ x+7y-3z=-22;\ 2x-y+6z=22.$

SECTION -C (30 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 x 6 = 30)

11. a) Find the eigen values and eigen vectors of the matrix $\begin{bmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{bmatrix}$.

(OR)

b) Find the characteristic equation of A= $\begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ and show that it satisfies the equation and hence find A^{-1}.

12. a) Solve (i) $z=p^2+q^2$ (ii) $pq=xy$.

(OR)

b) Solve $(x^2-yz)p+(y^2-zx)q=(z^2-xy)$.

13. a) Find the Fourier expansion of f(x) = $\frac{1}{2}(\pi - x)$ in $(0, 2\pi)$.

(OR)

b) Find the Fourier sine series for $f(x)=\begin{cases} x, & 0\le x\le \pi/2 \\ \pi - x, & \pi/2 \le x \le \pi \end{cases}$.

14. a) Find $L^{-1}\left[\frac{s^2+9s+2}{(s-1)^2(s+2)}\right]$.

(OR)

b) Solve $(D^2-D-2)y=0$ *given* $y(0)=-2, y'(0)=5$.

15. a) Solve by Gauss-Seidal method
$6x+15y+2z=72;\ x+y+54z=110;\ 27x+6y-z=85.$

(OR)

b) Solve by Gauss Jacobi method
$28x+4y-z=32;\ x+3y+10z=24;\ 2x+17y+4z=35.$

Z-Z-Z END